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WITH STATISTICS.

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SEASONAL INFLUENCES IN ERYSIPELAS, WITH STATISTICS.

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The predisposing causes of erysipelas have not hitherto received that careful study which they would seem to deserve. Among recent writers there are a few who contend that age, sex, season of the year, etc., have little influence upon the affection. By most authors, however, the disease is stated to be more frequent in the female than in the male sex, and more frequent in the young than persons in the advanced period of life.

Osler states that erysipelas is particularly prevalent in the spring of the year. "This was very noticeable in the Philadelphia Hospital, in which the erysipelas wards were usually empty except in the spring and autumn months." Clinical observation has clearly demonstrated that the following classes of individuals are peculiarly liable to the affection: (*a*) those who have sustained injuries or abrasions, even though very slight; (*b*) persons who have undergone surgical operations; (*c*) women recently delivered; (*d*) persons suffering from chronic alcoholism and Bright's disease.

It is a well-known fact that in many persons there is an individual predisposition, the complaint occurring in them repeatedly. Institutions in which unhygienic conditions prevail, afford numerous cases as a rule. The object of the present researches, to which I desire to call the attention of this Association, was in the main to ascertain the influence of the seasons on the appearance of cases of erysipelas. And although

they brought to light many interesting facts relating to other predisposing factors in this disease, these latter must be the basis of a separate paper. The present analysis of 2012 cases, collected from various sources, though chiefly from the wards of different hospitals of Philadelphia, gives the following result, when computed month by month.

TABLE I.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Blockley . . .	31	19	31	30	13	9	10	8	16	17	26	26
Blockley . . .	92	88	119	121	109	53	40	29	34	45	60	87
Pennsylvania Hospital	59	72	71	115	74	32	28	23	10	30	43	64
Presbyterian Hospital	1	5	5	7	6	3	1	3	1	1	1	1
Episcopal Hospital .	6	8	9	17	6	9	4	3	3	...	8	2
Johns Hopkins . .	1	2	2	4	1	...	...	...	1	2	1	2
German Hospital .	2	1	1	2	1	1	...	1	...	...	...	...
Private practice .	12	13	17	25	15	8	6	6	9	10	11	11
Total for each month	204	208	255	321	225	115	89	73	74	105	150	193

In this connection I desire to acknowledge my best thanks to those who have kindly assisted me in collecting the statistics obtained from the several institutions before named. To Dr. George H. Crabtree for collecting the cases from the records of Blockley Hospital, to Dr. M. B. Miller for the cases obtained from the Pennsylvania Hospital, to Dr. J. S. Bromley for those furnished from the Episcopal Hospital, to Dr. Wiser for furnishing the cases from the Presbyterian Hospital, to Dr. William Osler for those from Johns Hopkins, to R. L. Pitfield for those from the German Hospital, and to the many professional friends who supplied cases from private practice.

A glance at the foregoing table will show that, considering the total number of attacks for each month, August gives the fewest cases, and that from month to month the number of cases increases in slightly varying ratio until we reach April,

which gives the maximum number; then there follows a rapid decrease until we arrive at the starting point or August. Again, a little computation will show that one-half of all cases occur during the months of February, March, April, and May, and 15.9 per cent. of all cases during the month of April alone. It would appear that the winter and spring months, though more particularly the latter, influence the susceptibility to the complaint. The minimum number of attacks are seen to occur in summer and autumn.

The subjoined Table (No. II) represents all the data for twenty years, namely 1871–90 inclusive. Tracing (*a*) represents 1163 cases of erysipelas. It will be observed that this tracing corresponds very closely to the number of attacks expressed in figures, contained in the general Table (No. I). Since 847 of the cases found in the latter table occurred either before 1871 or subsequent to 1890, they were eliminated from Table No. II. I have deemed it needless to give a tracing showing the totality of cases (2012), since it was found to be identical in almost every particular with that representing the 1163 separate attacks. Thus the influence of season upon the appearance of this disease is definitely established. This table also shows the mean barometer (tracing *b*), and the mean relative humidity (tracing *c*), for the same period for Philadelphia, to which further reference will be made presently.[1] It might be argued that since the statistics were taken chiefly from hospital records they did not indicate the actual effect of season on this disease. It will, however, be observed on referring to Table No. III, that the cases collected from private practice give strikingly similar monthly and seasonal variations to those indicated by the hospital statistics.

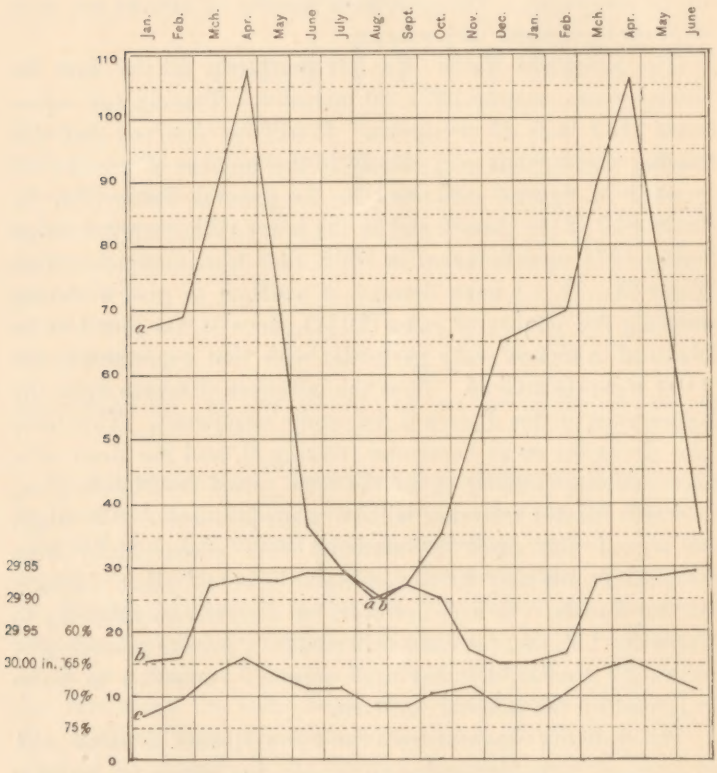
The statistics obtained from the Pennsylvania Hospital, 621 in number, show September to furnish the minimum number of cases (10). The months from October to April show on the whole a steady increase, and a rapid decrease from April

[1] My best thanks are due to Mr. Dey, signal service officer, for the courtesy he extended in allowing me access to the records of his office.

to September. Of the 621 cases 116 occurred in April or 18.7 per cent. The same ratio in favor of April obtains for the cases collected from the various other institutions.

The tracings in Table III represent: (*a*) 143 cases from private practice; (*b*) 621 cases from Pennsylvania Hospital;

TABLE II.

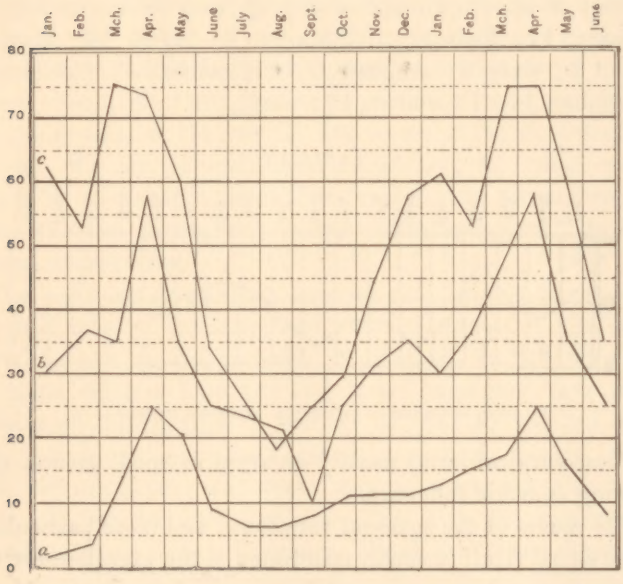


a. 1163 cases occurring from 1870 to 1890 inclusive.
b. mean barometer " " " " "
c. " relative humidity from 1870 to 1890, inclusive.
The cases increase in increments of 10.
Barometer is reckoned in inches.
Mean relative humidity is given in percentages.

and (*c*) 1113 cases from the records of old Blockley. It will be seen that the general character of the tracings bear a strong resemblance to one another.

In many instances the month of onset could not be readily determined, and sometimes the date of admission into the

TABLE III.



No. of Cases.

143 (*a*) Increase in increments of 10. Private practice.
621 (*b*) " " " " 20. Pennsylvania Hospital.
1113 (*c*) " " " " 20. Philadelphia (Blockley) Hospital.

hospital was, from necessity, considered to be the month of onset. In the instances of traumatic erysipelas embodied in these statistics, the date of onset of individual attacks could be accurately determined.[1]

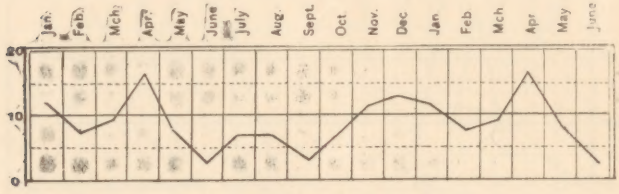
Of the 2010 cases only 101 have been recorded as purely

[1] In this connection it should be pointed out that all cases herein reported are classified in accordance with their time of onset.

*

surgical ones. The tracing in Table IV (*infra*) represents the traumatic cases, and shows in a general way the character of tracing (*a*) found in Table No. II, though a few deviations from what may be regarded as the normal type of this affection may be noted. Thus June marks the lowest point (2 cases), April the highest, as is usual; but the increase for April is not as pronounced as when the idiopathic cases are included. The number of attacks for each month of the year was as follows: January, 11; February, 8; March, 9; April, 16; May, 8; June, 2; July, 6; August, 6; September, 4; October, 6; November, 11; December, 13; total, 101.

TABLE IV.



101 cases of traumatic erysipelas. (Increase by tens.)

These surgical forms usually occurred in small groups, thus showing endemic influence.

The causes of the seasonal variations, and more particularly of the signal April increase, manifested in the prevalence of this disease have not as yet been definitely determined. Dr. Morris J. Lewis in a paper on "The Seasonal Relations of Chorea and Rheumatism, Extending over a Period of Fifteen Years, 1876–90 Inclusive," calls attention to the important practical fact that there is a spring augmentation of disease in general. He continues: "In my own practice, which is a general one, I find that the most visits are paid in March, namely 15.3 per cent., and from that point the percentage of visits falls to mid-summer (absence of patients from city largely influences this fall); then gradually rises to January, 13.3 per cent.; falls in February to 10.5 per cent.; and rises to its highest point in March.

" This varying percentage I find is about the same as regards the practice of other physicians whom I have interrogated concerning this point, and might be considered by some as a sufficient cause to explain the March rise in the Philadelphia chorea tracings, upon the theory that March is the month when most disease occurs, but might I not pertinently ask the question, " What causes this March rise in disease?"

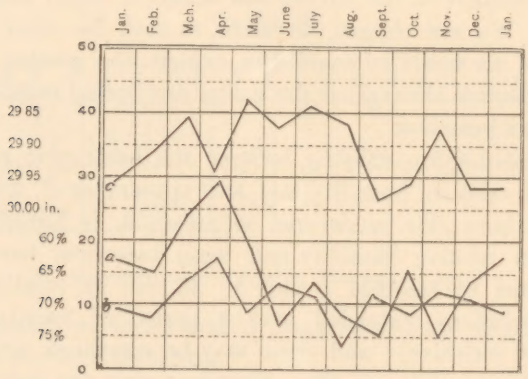
Reasoning from analogy, the increased prevalence of erysipelas in the spring of each year, more especially in April, cannot be accounted for by the general enrichment of illness at this season, since the greatest proportion of cases, and therefore the summit of the curved line occurs in April instead of March. We are obliged, therefore, to seek for other causal factors if we would be enabled to explain the greater spread of the affection throughout the winter and spring months than autumn and summer.

The relationship existing between the barometric pressure and the relative humidity and the appearance of this complaint, I have also endeavored to ascertain. In Table No. II the mean relative humidity and mean barometer have been represented by tracings *b* and *c*. It will be recalled that the observations extended over a period of twenty years (1871–90 inclusive); and these may be compared with tracing *a*. It may be seen that coincident with the increase of separate attacks during February, March and April there is a fall in the mean barometer and relative humidity. In summer, when the minima of cases appear, the mean barometer continues to be low, while the relative humidity increases steadily, reaching its highest point in August, the month giving us the fewest attacks.

Throughout the rest of the year neither the mean barometer nor the mean humidity tracings exhibit a constant or definite causal ratio to the erysipelas tracings. For example, the mean relative humidity during November and December gradually augments, corresponding with an increase in the percentage of attacks. A moment's reflection, however, will convince any thoughtful mind that the influence of individual climatic factors,

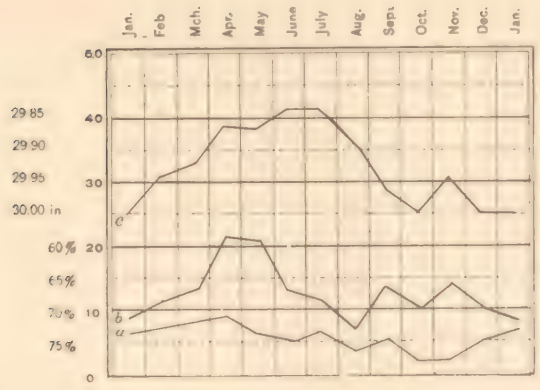
as well as any sudden, great, temporary, meteorological disturbances would be lost by a study of the mean barometer and the mean degree of saturation of the air extending over so long a period as twenty years. To obviate, so far as possible, this source of error I have selected the years 1885–86, which showed the largest number of cases for the period of two years, and these were studied together with reference to the points at issue; also two years (1871–72), which showed the fewest attacks. (See Tables V and VI.)

TABLE V.



Tracing *a*, in Table V, which characterizes the relative frequency of 170 separate cases (for the years 1885–86) exhibits the same proportionate increase in the number of cases for April as observed in Table II. The mean barometer during the April rise of the erysipelas tracing was low; but, as in the former instance, there is no resemblance between these two lines throughout June, July and August. The tracing indicating the mean relative humidity for 1885–86 bears very nearly the same relationship to the erysipelas tracing for the spring and summer months as shown in Table III, except that the decrease in the degree of saturation is not quite so well marked in the month of April. Here, again, for the rest of the year there is lack of harmony between the various tracings.

TABLE VI.



(*a*) Erysipelas tracing.
(*b*) Relative humidity tracing.
(*c*) Barometer.

Table VI represents the smallest number of attacks for two years (1871–72; and the tracings have in every leading particular the same form as those noted in Table V.

Surely the mean relative humidity tracings in all my investigations rise and fall with the erysipelas tracing during the first six months of the year. In other words, the number of cases of this complaint increases as the relative humidity diminishes.[1]

Again, the uniform results of these investigations into the mean annual barometer are as follows: The barometric pressure becomes lower during the winter and spring augmentation of attacks, maintaining this low standard throughout May, June, July and August, whilst during the latter months the cases steadily decline. Storm tracings have not been attempted. Erysipelas belongs to the acute infectious diseases, hence it was thought to be highly improbable that a study of the effect of storms upon this disease would throw any new light upon its etiology.

I have also studied carefully the temperature range for the

[1] It must ever be recollected that the reading of the barometer and relative humidity tracings are reversed as compared with the erysipelas line.

period of years embraced in the present discussion, and although this is an important climatic component, no data have been obtained that would tend to establish a relationship with the disease under consideration. Corresponding with the increase in the number of attacks, or the rise in the erysipelas tracing during January, February, March, and April, there is a steady rise in the mean temperature. On the other hand, the erysipelas line rapidly declines from April to July, while the mean temperature during the latter period continues to rise steadily. During the autumn, whilst the temperature is regularly declining, there is a constantly increasing prevalence of the affection. On comparing the temperature record with the mean barometer and mean relative humidity, we find that their several forms do not accord with one another, except during the first four months of the year. Hence the temperature chart, as a whole, offers no satisfactory explanation of the peculiarities that characterize the appearance of this disease.

Dr. Morris Booth Miller, while engaged in collecting the data from the Pennsylvania Hospital, made the interesting observation that many cases of erysipelas admitted into that institution occurred among sailors while at sea. At first sight it might appear that the explanation of their frequent occurrence under these circumstances might be found in some peculiarities presented by sea air. It is true that the marine climate has a more variable and, on the whole, a lower temperature than the climate some distance from the sea; but these facts, in the light of our researches, fail to furnish even a plausible interpretation of the observation noted by Dr. Miller. On the other hand, it must not be forgotten that the sanitary conditions of ships are often most unfavorable.

It should be noted that in 1885–86, the two years which gave us the larger number of cases, the mean temperature was a little higher for the months of January, February, March, and April than for the years 1871–72, but not any higher than for other periods of two years in which the cases were not as numerous as in 1885–86.

These observations also embraced a consideration of the relation of the seasonal influences to the mortality rate—a question of considerable interest and importance. Preliminary to an attempt at showing the influence of seasons on the death-rate, it is deemed needful for purposes of clearness to introduce the following table, in which is indicated the number of cases in which the termination was noted, their source, the death-rate for each institution, as well as for those gleaned from private practice, in percentage and the mean general death-rate:

TABLE VII.

Source of cases.	Number of terminations recorded.	Number of deaths.	Percentage of deaths.	General average mortality.
Blockley Hospital . . .	1095	73	6.29 per ct.	
Pennsylvania Hospital . .	523	27	5.1 "	
Episcopal Hospital . . .	71	9	12.6 "	
Presbyterian Hospital . . .	.....	.....	.....	6.57 per ct.
Johns Hopkins	16	3	18.75 per ct.	
German Hospital	9	3	33.3 "	
Private practice	96	4	4.16 "	
Total	1810	119	6.57 "	Average

Reckoned from the above table it was found that as compared with the number of cases, the death-rate for April is lower than for March, June, September, October, and December, the highest death-rate in these statistics occurring in June and the next highest in September.

The results of the present researches justify the following conclusions: 1. Erysipelas is to a considerable extent dependent upon seasonal influences. 2. Certain leading climatic elements have a decisive, though, perhaps, slight causative influence. 3. Among meteorological factors temperature has least and the mean relative humidity the most intimate connections with the disease. 4. *A low barometer and mean relative humidity invariably correspond with the annual*

period in which the greatest proportion of cases occur, and the highest mean relative humidity with the months affording the fewest attacks. 5. Erysipelas is not to the same extent as chorea and rheumatism related to the seasonal variations in the totality of human illness. 6. The mortality rate is but little if at all affected by seasonable influences, since the periods of highest death-rate were too brief to be regarded as being attributable to seasonal conditions.